# AKTIVITAS ENZIM DAN DINAMIKA PROTEIN CAIRAN RUMEN PADA REKAYASA PAKAN ADITIF SECARA *IN VITRO*

# (ENZYMENT ACTIVITIES AND DYNAMICS OF RUMENT LIQUID PROTEINS ON ADDITIVE FEED ENGINEERING *IN VITRO*)

**Agung Prastyo Nugroho**
Fakultas Peternakan Universitas Jenderal Soedirman, Purwokerto
**pnagung4@gmail.com**

## ABSTRAK

Penelitian bertujuan mengkaji pengaruh penambahan pakan aditif dalam pakan ruminansia sebagai upaya meningkatkan aktivitas protease dan selulase, menurunkan aktivitas amilase serta mengkaji pengaruh pakan aditif terhadap total protein cairan rumen pada lama inkubasi yang berbeda. Penelitian bersifat eksperimental menggunakan metode *in vitro*. Terdapat empat perlakuan yang diuji yaitu terdiri dari P0 = Pakan basal (60% konsentrat : 40% hijauan); P1 = P0 + 0,5 % isobutirat; P2 = P1 + 0,5 % *S. cerevisiae*; P3 = P2 + 1 % minyak kedelai. Penelitian menggunakan rancangan acak lengkap *(one way classification)*, setiap perlakuan diulang sebanyak 5 kali sehingga terdapat 20 unit percobaan. Pengukuran aktivitas protease, amilase dan selulase dilakukan pada inkubasi selama 4 jam dan pengukuran dinamika protein dilakukan pada inkubasi jam ke 0, 4, dan 8. Penelitian dilakukan di Laboratorium Ilmu Nutrisi dan Makanan Ternak (INMT) Fakultas Peternakan, sedangkan pembacaan spektrofotometer di lakukan di Laboratorium Riset Terpadu Universitas Jenderal Soedirman. Hasil analisis variansi menunjukan bahwa penambahan pakan aditif berpengaruh sangat nyata ($P<0,01$) terhadap aktivitas protease dan selulase dalam cairan rumen, akan tetapi tidak berpengaruh nyata ($P>0,05$) terhadap aktivitas amilase. Hasil analisis variansi menunjukkan bahwa pada inkubasi 0, 4, dan 8 jam perlakuan P0 dan P1 tidak berpengaruh nyata ($P>0,05$) terhadap kadar protein. Sedangkan inkubasi 0 dan 8 jam pada perlakuan P2 dan P3 juga tidak berpengaruh nyata ($P>0,05$) terhadap kadar protein cairan rumen. Akan tetapi hasil analisis variansi pada inkubasi 4 jam pada perlakuan P2 dan P3 menunjukkan perlakuan berpengaruh sangat nyata ($P<0,01$) terhadap kadar protein. Kesimpulan dari penelitian ini yaitu penambahan isobutirat pada substrat pakan merupakan perlakuan yang paling efektif dalam meningkatkan aktivitas protease dan selulase serta menekan aktivitas amilase. Penambahan isobutirat yang dikombinasi dengan *S. Cerevisiae* pada substrat pakan mampu meningkatkan kadar protein cairan rumen pada jam ke 4 inkubasi secara *in vitro.*

**Kata Kunci:** Pakan aditif, enzim, *in vitro*, protein.

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Fakultas Peternakan Universitas Jenderal Soedirman, Purwokerto
**pnagung4@gmail.com**

## ABSTRACT

This study aims to examine the effect of adding feed additives in ruminant feed as an effort to increase protease and cellulase activity, reduce amylase activity and to examine the effect of feed additives on total rumen fluid protein at different incubation times. This research is experimental using *in vitro* method. There were four treatments tested, consisting of P0 = basal feed (60% concentrate: 40% forage); P1 = P0 + 0.5% isobutyrate; P2 = P1 + 0.5% *S. cerevisiae*; P3 = P2 + 1% soybean oil. This study used a completely randomized design (one way classification), each treatment was repeated 5 times so that there were 20 experimental units. Measurements of protease, amylase and cellulase activity were carried out at incubation for 4 hours and protein dynamics measurements were carried out at 0, 4, and 8 hours incubation. Integrated Research Laboratory of Jenderal Soedirman University. The results of the analysis of variance showed that the addition of feed additives had a very significant effect ($P < 0.01$) on the protease and cellulase activity in the rumen fluid, but had no significant effect ($P > 0.05$) on the amylase activity. The results of the analysis of variance showed that the incubation of 0, 4, and 8 hours of treatment P0 and P1 had no significant effect ($P > 0.05$) on protein content. While the 0 and 8 hours incubation in P2 and P3 treatments also had no significant effect ($P > 0.05$) on the protein content of rumen fluid. However, the results of the analysis of variance at 4 hours incubation in P2 and P3 treatments showed that the treatment had a very significant effect ($P < 0.01$) on protein levels. The conclusion of this study is that the addition of isobutyrate to the feed substrate is the most effective treatment in increasing protease and cellulase activity and suppressing amylase activity. The addition of isobutyrate combined with *S. cerevisiae* to the feed substrate was able to increase the protein levels of the rumen fluid at the 4th hour of incubation *in vitro.*

**Key Words:** Feed additives, enzymes, *in vitro*, protein.